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MECHANICS.

351. Proposed by J. G. ROSE, B. A. (Oxion), Mt. Angel College, Oregon.

ABC is a uniform triangular lamina of weight $3W$ such that $AB=2AC$. A particle of weight W is attached to it at C. Show that if the lamina be suspended from angle A, it will rest with AB and AC equally inclined to the vertical.

352. Proposed by G. B. M. ZERR, A. M., Ph. D., Philadelphia, Pa.

Assuming the earth's orbit to be a circle, if a comet move in an ellipse around the sun, in the same plane as the earth, with its perihelion nearer the sun than the earth, how long will it remain within the earth's orbit? Apply this to Halley's comet with the above assumptions, and supposing the eccentricity of its orbit to be 0.971733. Find its periodic time.

353. Proposed by W. J. GREENSTREET, M. A., Editor, The Mathematical Gazette, Stroud, England.

R_1 and R_2 are ranges on a horizontal plane of particles projected with given velocity from A on the plane to pass through B. Show that $a(R_1+R_2)-R_1R_2=\frac{a^4}{c^2}$, where $c=AB$ and a is the horizontal projection of AB.

NUMBER THEORY AND DIOPHANTINE ANALYSIS.

175. Proposed by H. C. FEEMSTER, A. B., Professor of Mathematics, York College, York, Nebraska.

Show (a) that $[(2n)!]/[(n+1)!n!]$ is an integer, and (b) that $[(2a)!(2b)!]/[a!b!(a+b)!]$ is an integer.

AVERAGE AND PROBABILITY.

206. Proposed by G. B. M. ZERR, A. M., Ph. D., Philadelphia, Pa.

A point O is taken at random in a triangle. What is the probability that if three other points are taken at random, one shall lie in each of the three triangles AOB, BOC, and COA? [Williamson's *Integral Calculus*, page 412, ex. 85.]

207. Proposed by JOSEPH V. COLLINS, Ph. D., State Normal School, Stevens Point, Wisconsin.

A formula for simple interest is, $i=prt/12$. If r is 5 or 7, what is the chance that the denominator will cancel out entirely into either p or t or both (where t is expressed in months and tenths of a month, written decimally with usually a common fraction after tenths). It is assumed that a factor of 12 can cancel into t if the integral part is divisible by 2, 3, or 4. Thus, to find the interest at 5% on $729.44 for 1 year, 9 months, 28 days, we write

$$1.8236\times5\times\frac{21.9\frac{1}{3}}{12}=?$$

NOTES AND NEWS.

The August-September number of the MONTHLY will be published September 28th.